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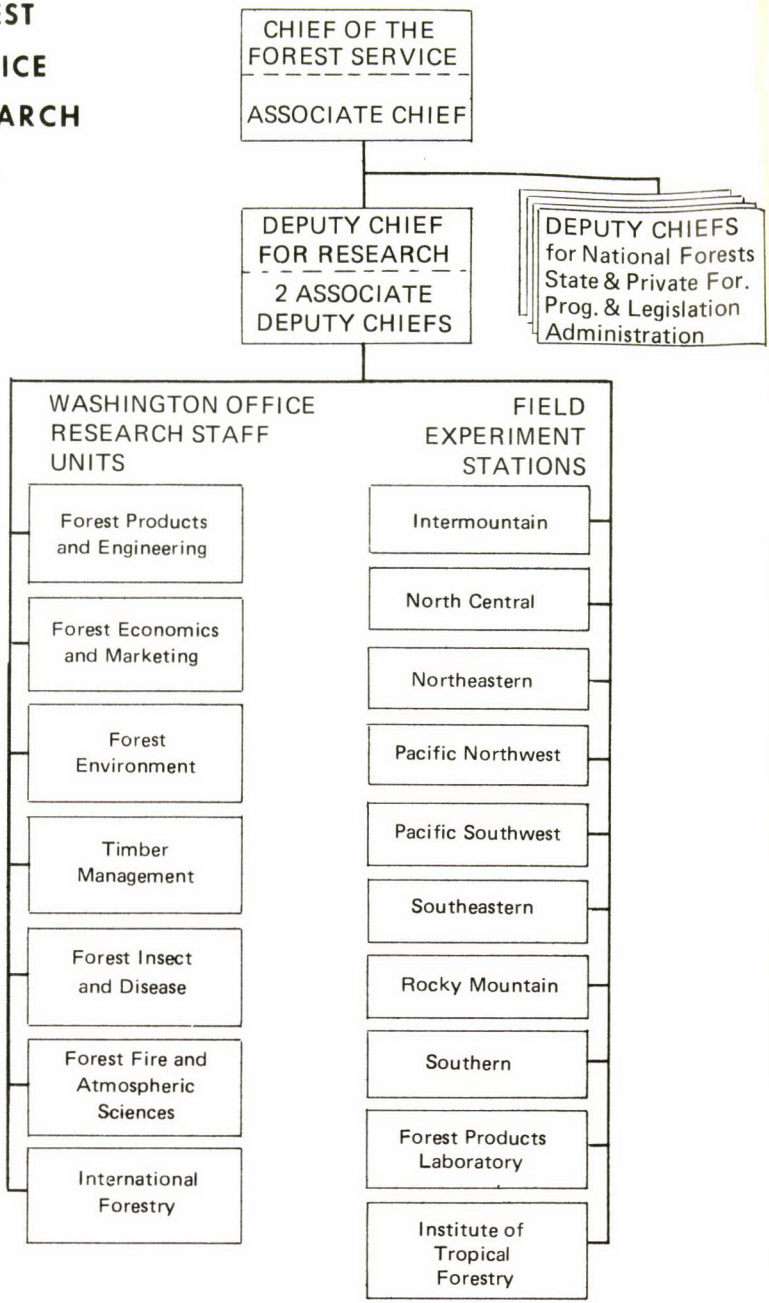
FOREST SERVICE RESEARCH

SOLVING PROBLEMS ON FOREST AND RELATED LANDS

FS-307

U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

FOREST SERVICE RESEARCH ARM



CONTENTS

	Page
FOREST AND RELATED LANDS	3
RESEARCH MISSION	4
SCOPE	7
RESEARCH PROGRAMS	13
Timber Management	13
Trees and Timber Management	13
Forest Watershed Management	13
Wildlife Range and Fish Habitat	13
Forest Recreation and Related Human Amenities	14
Forest Fire and Atmospheric Sciences	14
Forest Insects and Disease	14
Forest Products and Engineering	14
Forest Survey	15
Forest Economics and Marketing	15
Analyses of Wood Consumption and Trends in Major End-Use Markets	15
USERS OF FOREST SERVICE RESEARCH	15
RESEARCH CAPABILITIES	21
Research Direction and Administration	21
Professional and Support Personnel	23
Research Facilities	23
Cooperating Scientists	24
Management Documents	25
Authorities	25
Financing	26
APPENDIX	29
Forest Service Experiment Station Headquarters	29
RESEARCH FACILITIES	30
Forest Service Laboratories	30
Leased Facilities	32
Facilities Provided by Universities or States	33

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FOREST AND RELATED LANDS

Among America's prime assets are 1 ⅓ billion acres of forest and related lands. How well these assets are used affects the present and future well-being of every American.

The United States is unique in the diversity of its forests. Outdoor America includes 82 forest types—five times the number in Europe. Of the 82 forest types, more than 40 are important to the wood economy.

Nearly half of the area of the United States is made up of range lands, where herbs and shrubby plants abound. Of 92 important range types, 64 have high value to the livestock industry.

This variety offers great promise for prosperous and diversified industries and for widespread public benefits, but it also presents complex and unusual difficulties for land owners and managers in deciding how to make the highest and best use of the land for everyone concerned.

Ecological research on America's forest and range lands can benefit present and future generations by maintaining environmental quality, by providing recreational opportunities, and by strengthening the economic base not only for rural communities and their citizens but for all Americans.

F-502009

The Forest Service has stepped up its efforts to improve the timing of the delivery of water to meet seasonal needs. Here a Forest Service scientist is measuring streamflow in the Willamette National Forest in Oregon.

RESEARCH MISSION

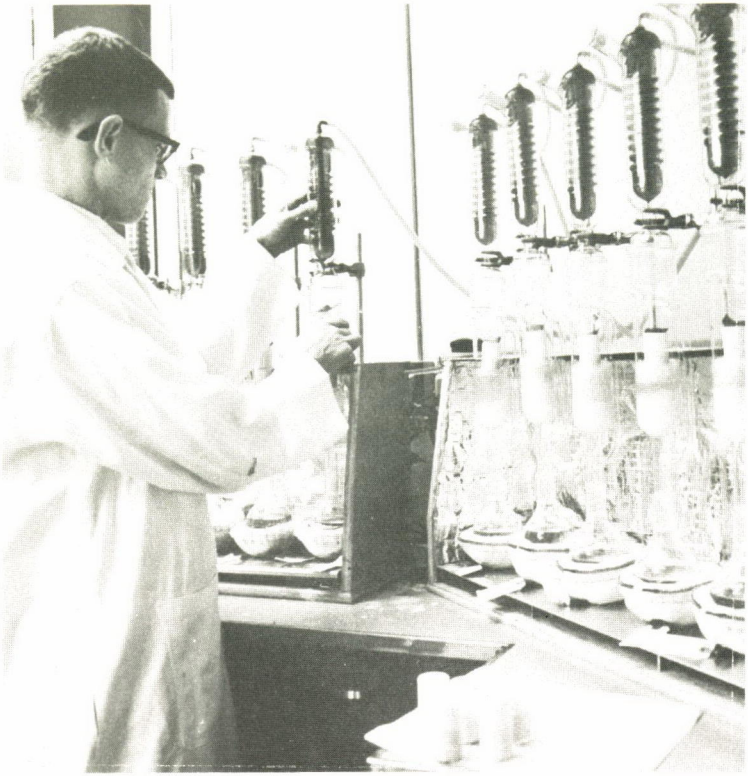
Today, as for the past six decades, the mission of Forest Service research is to develop the knowledge and technologies required to enhance the value to man—both economic and environmental—of all of America's forest and related lands.

More beautiful landscapes. Cleaner, healthier outdoor environments. More outdoor recreation opportunities. Improved supplies of water, wood, and wildlife. A plentitude of high-quality livestock. A sound ecological balance. Ample supplies of forest and range products for low-cost housing and other pressing needs. Fresh opportunities for development of rural America. All of these and other "products" of our forest and range lands are required to meet the compelling cultural demands and urgent economic needs of our growing population.

To help fulfill these needs, the current focus of Forest Service research is on finding better ways to use our private and public inventory of open space lands. This entails the discovery of new ways to reduce costs and to stretch resources to meet ever-growing requirements, and it demands a better understanding of ecosystems so that policy decisions and management practice can lead to improved productivity and quality of the environment.

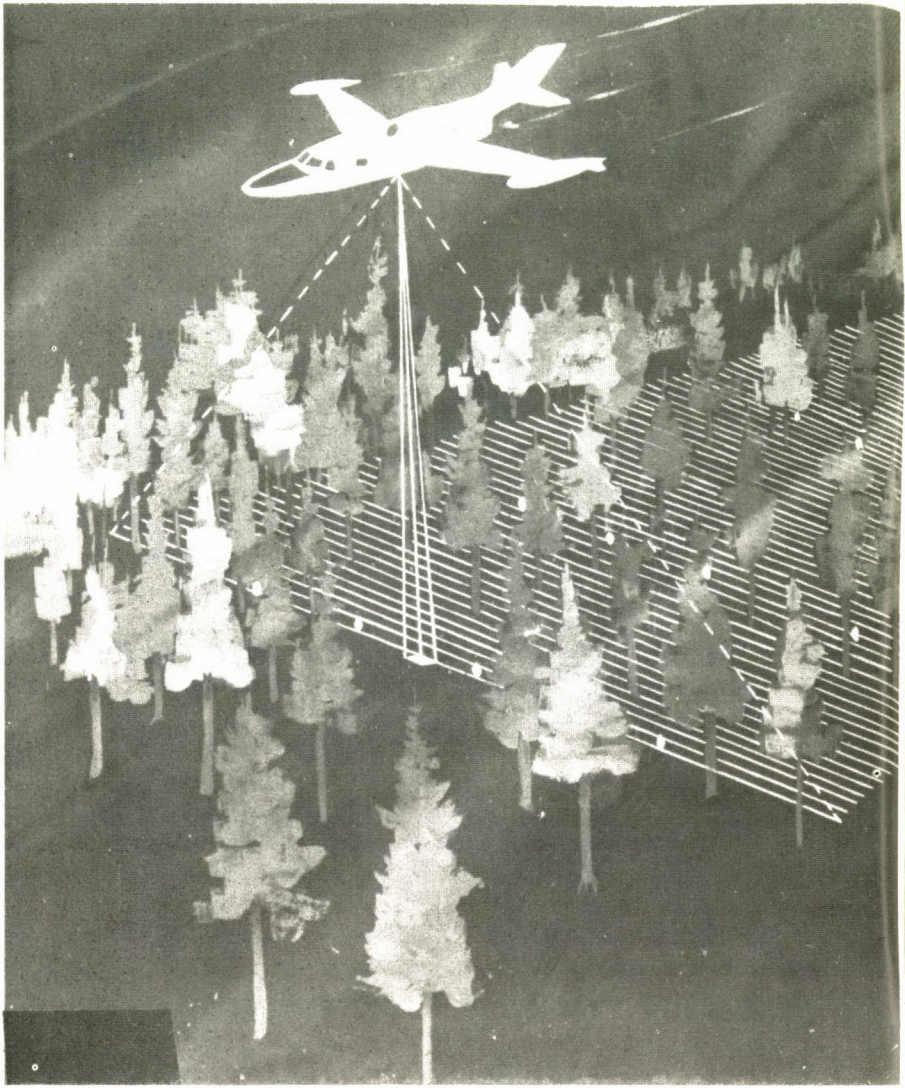
Everyone, everywhere, benefits when forest and range research discoveries are wisely applied. Accordingly, the Forest Service cooperates with many private and public research workers in the United States and abroad. Such cooperation avoids duplication of effort and accelerates solutions to a wide range of theoretical and practical problems.

The results of such research efforts, of course, are of no value unless they are put into practice or are used to pursue more advanced studies. Thus, to complete its research mission, the Forest Service takes steps to assure that the new knowledge reaches Federal, State, and local policymakers and the public and private land managers who need to apply the research findings.



F-515288

Forest Service research encompasses basic studies as well as the practical work needed to solve immediate problems. This experiment is part of a study of the physiology of the infection of wood by decay. Chemical analysis in the laboratory determines the presence or absence of various organic and inorganic chemicals related to such infections.



SCOPE

Forest Service research employs a full spectrum of disciplines in the biological, physical, economic, and social sciences to solve complex problems concerning forest and related ecosystems and their interfaces with urban areas.

The goal of this research is to learn how man for his well-being and enjoyment can best use and protect the plant, animal, soil, water, and esthetic resources of nonagricultural rural lands. In this quest, equal concern is shown for conservation of renewable resources . . . for productivity to meet the needs of a growing nation . . . and for improvement of the environment.

A few current studies suggest the diversity of Forest Service research:

- Research is being conducted to improve helicopters, balloons, and skyline logging systems to facilitate harvesting in areas of fragile and rough terrain; such aerial harvesting systems hold promise for reducing the need for road construction and of greatly reducing environmental damage due to timber harvesting.
- For the first time, as a result of Forest Service research, attractant-based natural control has been shown to be effective over a large area in the reduction of bark beetle populations, in reduction of damage, and in nondisruption of the beetle's natural enemies.
- Researchers are studying the culture and placement of forest vegetation to reduce noise and to ameliorate harsh rural and urban environments.
- Sewage effluent and sludge applications are being studied as a potential method of waste disposal that would use the waste to fertilize forest lands.

F-518605

Forest Service research is making full use of the latest developments in remote sensing technology. Project "Fire Scan" employs such techniques to rapidly search vast areas for early detection of fires.

- The Forest Service, working with other Federal, State and local agencies, is determining ways in which forest products can augment the Nation's energy resources or ways that significant amounts of energy can be conserved.
- Project "Fire Scan" is seeking ways to employ aerial methods of infrared remote sensing for detecting forest fires.
- The Forest Service is studying ways to economically utilize forest residues for such things as structural particleboards, paper-pulp, or as fuel.
- Urban forestry is the focal point of a new project using a multidisciplinary team to study the function of forests, parks, and other natural open spaces in and near to major urban areas in the megalopolis of the Northeast. The results will be major contributions to planning and mangement of cities and forests at the urban interface.
- A wilderness travel simulation model has been developed and tested. This model is being put to work by managers to analyze visitor use of wilderness areas and to develop plans that will protect wilderness ecosystems, preserve solitude, and permit visitation by people.

These are but a few examples of Forest Service research studies.

Although Forest Service research entails many separate studies, each of them in some way clarifies our understanding of the overall pattern of relations between organisms and their environment. Each factor in the environment—human, animal, vegetable and inanimate object—affects the overall economic and ecological balance. Changes in one factor, to a greater or lesser degree, affect all the other factors.

Proper conservation of each forest and related type in each life zone presents a unique set of problems whose solutions require multidisciplinary research. For each type, this involves studies of the character and interaction of the soils, water, vegetation, animal population, and other environmental factors. Such research employs analysis as the key to understanding the ecological impact on the forest or range ecosystem when one or more factors are altered as a result of management practices or

of accident, fire, hurricane, or other event. The results of this and related research are helpful in formulating guidelines for ecosystem management.

The way in which any single tract of forest or range land is used affects the environmental and economic balance—locally and nationally. When a tract is used to the limit for a single purpose (such as timber production alone or grazing alone), the usual result is a short-term gain at the expense of the overall economy and environment. But through wise application of research results, each tract can—at the same time—be managed to serve many purposes. For example, research has shown that the use of certain timber harvesting and grazing techniques tends to increase rather than diminish the ability of a tract to provide recreation, wildlife, water, and other values.

Forest and related lands provide open spaces for human enjoyment. Current Forest Service studies are seeking new ways to:

- Eliminate soil erosion as a major source of water pollution.
- Reduce the cost of protecting soil and vegetation.
- Heal the blemishes that man has left on many landscapes.
- Harvest resources without leaving scars upon the land.
- Create pleasant landscapes by providing variety and interest in the patterns of vegetation.
- Grow trees and shrubs that provide better shelter for man, his home, and his activities.

As they gain more leisure time and greater mobility, growing numbers of Americans are turning to the out-of-doors. The dramatic increase in camping, backpacking, fishing, hiking, and other outdoor pursuits has overtaxed present facilities in many areas. To help overcome the shortage, Forest Service research is seeking ways to expand recreation facilities, to help make private recreation enterprises more profitable, and to reduce the investments required for recreation. In the same vein, researchers are looking at the effects of outdoor recreation on city dwellers who have never experienced the natural wonders that lie beyond their congested neighborhoods.

The quality of life, agriculture, fishing, and industry in any region hinges on the availability of an ample supply of clean, fresh water, Recent discoveries and research still in progress promise to show us how to increase yields of high-quality water and to improve sport and commercial fisheries. Application of the results of such research is helping to prevent erosion and siltation of water supplies and reservoirs on millions of acres of forest and related lands. In its current research, the Forest Service has stepped up its efforts to find ways to improve the timing of the delivery of water to meet seasonal needs. Parallel studies are revealing techniques for using fertilizers and other chemicals in a manner that improves harvests without contributing to water pollution.

Despite the inroads of new, competing materials, wood remains a prime resource; harvested wood in the United States is about equal to the tonnage of all metals, plastics, and portland cement combined. The trend toward use of wood substitutes, moreover, is arousing new concerns over the environmental damage wrought in producing the colossal amounts of energy that are expended in processing nonrenewable minerals. These new concerns over the environment and the forecast that annual needs for housing will double in the coming decade foretell greater demands for wood. Forest Service research, therefore, seeks new ways to use wood more efficiently, particularly in housing and other construction; to increase the yield of wood per acre; to reduce the costs of growing, harvesting, transporting, and manufacturing wood products; to open up sources of wood that are now economically inaccessible by the development of new harvesting systems that will not damage the environment. Unless much of this research is successful, the Nation's housing goals cannot be realized.

Some parts of rural America have been designated as low-income areas. Special efforts are needed to raise the standard of living in such areas. Currently, the Forest Service is conducting utilization studies and market research that is aimed at finding sound, long-term uses for certain resources available in low-income areas. Some research focuses on helping rural

residents to increase the profitability of raising livestock and to induce the proliferation of game and other wildlife. Other research aims at the development of designs, materials, and methods that will facilitate the construction of modern, low-cost housing to replace dilapidated and outmoded dwellings. Hopefully, such research will help to reverse the flight of citizens from rural to urban environments.

F-506922

Timber management research includes studies of the ecological impact of fires, hurricanes, and other events. Here a forest scientist examines heart rot in the basal log of a sugar maple tree for indications of the cause.

RESEARCH PROGRAMS

The major reseach programs of the Forest Service may be outlined as follows:

Trees and Timber Management

Techniques of forest management planning. Techniques of timber management. Forest ecosystems with trees as a principal component. Forest genetics. Cultural methods for timber and timber-related crops.

Forest Watershed Management

The hydrologic cycle. Hydrology of watersheds in forest and range ecosystems. Hydraulics of mountain streams.

Watershed protection and rehabilitation. Development and testing of methods for increasing or regulating water yields, reducing flood runoff, and improving water quality. Fisheries and other aquatic habitats.

Wildlife Range and Fish Habitat

Develop and evaluate methods of improving livestock grazing and mammal, bird, fish, amphibian, and reptile habitats. Minimize adverse effects of other resource uses on wildlife.

F-521786

Improved aerial harvesting systems hold promise for greatly reducing environmental damage due to logging. Here a helicopter is being used for Forest Service harvesting research in the Plumas National Forest.

Forest Recreation and Related Amenities

Use and management of public and private forest lands for outdoor recreation and for esthetic enjoyment. Motivations, interests, and needs of visitors to outdoor recreation areas. Economic impacts and future trends in outdoor recreation. Use and management of wilderness. Integrating recreation use with other uses.

Forest Fire and Atmospheric Sciences

Methods and techniques for prevention and control of fires. Forest fire behavior. Methods of using fire beneficially in wildland management. Atmospheric forces and conditions as related to forest fires.

Forest Insects and Disease

Detecting, measuring, and evaluating the impacts of forest insect and pathogen populations. Life cycles and requirements for growth, infection, and attack. Influence of climatic, site, and host conditions. Biologically sound, economically feasible, and ecologically acceptable methods for preventing, avoiding, suppressing, and controlling forest insects and diseases.

Forest Products and Engineering

Characterization of wood as a basic raw material for industrial use in fiber and chemical applications. Improved methods and techniques in the use of wood. Improvement of wood products. Development of new and better wood and wood-base products. New and more efficient processes for manufacturing wood products. Improved construction materials and systems using wood products and components. Engineering aspects of harvesting and transportation of wood, reestablishment of forests, protection and improvement of timber stands and watersheds, and providing access for multi-purpose use of forests.

Forest Survey

Planning, organization, and technical direction of a nationwide survey to determine: Extent, location, and condition of forest lands. Quantity, composition, quality, and availability of timber on such lands. Current and probable future rates of timber growth and mortality. Current cutting drain on the forests. Relationship of other forest land uses to timber production. New and improved methods of conducting forest surveys.

Forest Economics and Marketing

Public and private costs and benefits of various practices under different conditions of site, type, and ownership. Economic obstacles to the practice of forestry and possible solutions to such problems, including improvements in forest taxation, insurance, and credit. Principles and guidelines for use in balancing and correlating multi-purpose uses of forest lands.

Analyses of Wood Consumption and Trends in Major End-Use Markets

Improvements in the marketing system for forest products aimed at lowering costs and increasing the efficiency of harvesting, transporting, processing, distributing, selling, and using forest products.

USERS OF FOREST SERVICE RESEARCH

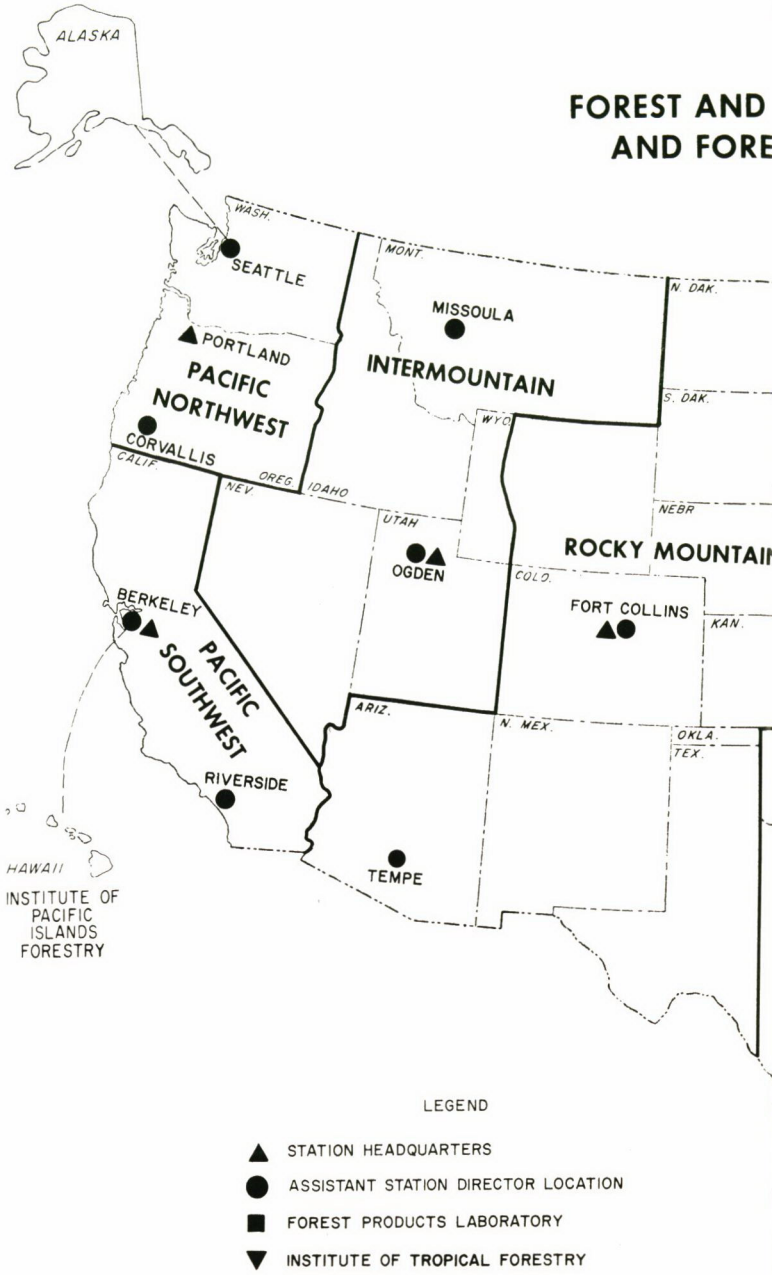
Numerous agencies of Federal, State, and local governments plus industry and private citizens use the information and methods generated by Forest Service research to improve their policies and practices. Research results are also widely used by universities in their teaching, research, and extension programs.

Some Federal agencies that are major users of Forest Service research include:

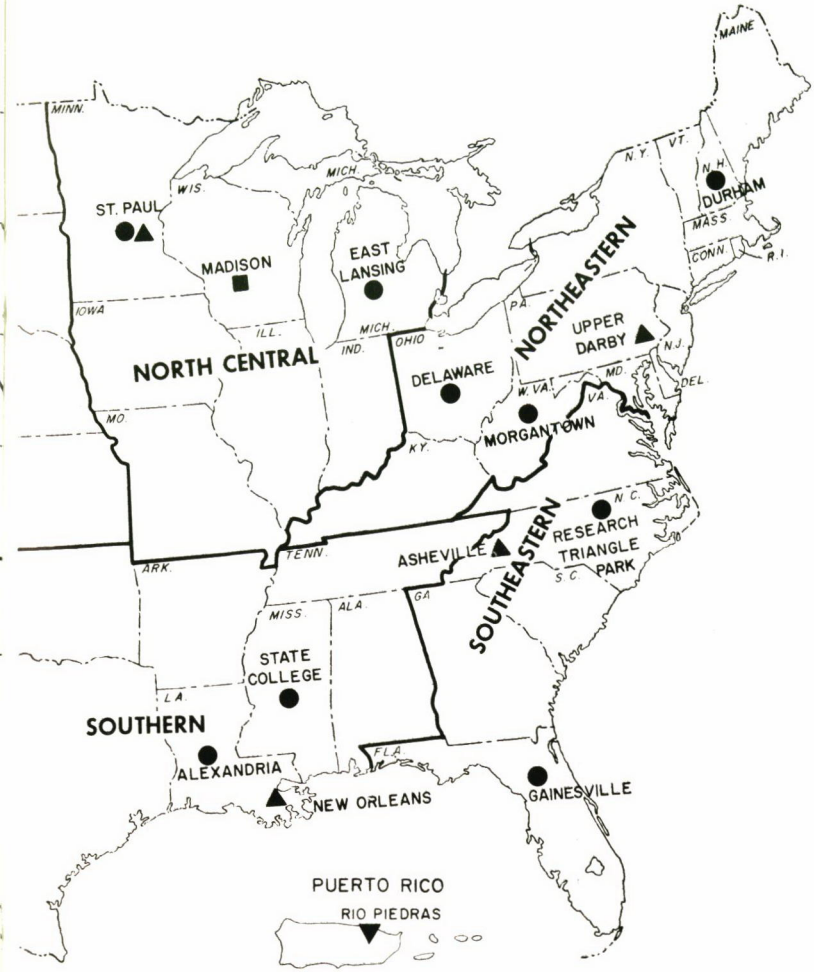
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of the Interior
  - National Park Service
  - Bureau of Land Management
  - Bureau of Reclamation
  - Bureau of Indian Affairs
  - Bureau of Sport Fisheries and Wildlife
  - Bureau of Outdoor Recreation
- Department of Defense
  - Naval Material Command
  - Advanced Research Projects Agency
  - Managers of lands on military installations
  - Armed Forces Pest Control Board
- Department of Commerce
  - Bureau of Domestic Commerce
  - National Bureau of Standards
  - National Oceanic and Atmospheric Administration
  - Economic Development Administration
- Department of Housing and Urban Development
  - Federal Housing Administration
- Department of Health, Education, and Welfare
  - National Air Pollution Control Administration
  - Bureau of Criteria and Standards
- Environmental Protection Agency
- National Aeronautics and Space Administration
  - Earth resources applications

F-493527

Managers of Federal, State, and private forests are among the major users of Forest Service research. The experimental planting shown here is part of a genetics research study designed to greatly increase the yield of wood per acre. At left is a group of Ponderosa pine. At right behind the tall measuring rod is a group of hybrid pines. Both groups are 11 years old.


FOREST AND
AND FORE
ALASKA
WASH.
SEATTLE
PORTLAND
PACIFIC
NORTHWEST
CORVALLIS
CALIF.
OREG.
NEV.
IDAHO
MONT.
MISSOULA
INTERMOUNTAIN
WYO.
UTAH
OGDEN
N. DAK.
S. DAK.
NEBR
ROCKY MOUNTAIN
COLO.
FORT COLLINS
KAN.
BERKELEY
PACIFIC
SOUTHWEST
RIVERSIDE
ARIZ.
TEMPE
N. MEX.
OKLA.
TEX.
HAWAII
INSTITUTE OF
PACIFIC
ISLANDS
FORESTRY
LEGEND
STATION HEADQUARTERS
ASSISTANT STATION DIRECTOR LOCATION
FOREST PRODUCTS LABORATORY
INSTITUTE OF TROPICAL FORESTRY

ANGE EXPERIMENT STATIONS
PRODUCTS LABORATORY



INSTITUTE OF TROPICAL FORESTRY
PUERTO RICO AND U.S. VIRGIN ISLANDS

RESEARCH CAPABILITIES

The Forest Service of the U.S. Department of Agriculture has the largest forestry research organization in the world. Forest Service scientists are acknowledged leaders in nearly every discipline required in forestry research. Forest Service facilities, particularly those that have been developed in recent years, provide the scientists with the special equipment, laboratories, and land areas needed to solve today's most challenging forestry problems.

Through cooperative ties in this country and abroad, the Forest Service draws upon special talents and facilities of universities, States, private industry, and other Federal agencies.

This research capability, over a half century in the making, has created a rich fund of basic knowledge from which future innovations can be derived. Most of the technology now used in the management of public and private forest and range lands can be attributed to discoveries made within the past 20 years by the Forest Service or by cooperating scientists.

Research Direction and Administration

At the national level, in Washington, D.C., the Forest Service research organization is directed by the Deputy Chief of the Forest Service for Research. At the field level, the research organization is led by Directors of eight Regional Experiment Stations, the Forest Products Laboratory, and the Institute of Tropical Forestry. (See organization chart on inside front cover.)

F-518123

Forest Service research involves many specialities. Here an entomologist prepares to X-ray a bark sample to determine the population of western pine bark beetles within the bark.

Conducting research over such a widespread land area and on such diverse scientific problems requires a decentralized organization.

The small headquarters staff in Washington, D.C., has three responsibilities: National program formulation and direction, interagency coordination, and research requiring frequent contact of scientists with national institutions.

The research program is carried on through the eight Regional Experiment Stations, the Forest Products Laboratory at Madison, Wisconsin, and the Institute of Tropical Forestry at Rio Piedras, Puerto Rico. These research centers supervise more than 3,700 studies in support of 325 research projects at 80 locations in 42 States and Puerto Rico. This research program reaches into every major terrestial ecosystem and life zone. Coverage extends from the tropics of the Arctic, from our island State and territories in the Pacific and across the continent to Puerto Rico in the Atlantic.

The Forest and Range Experiment Stations are responsible for solving regional problems, but many of their research programs have interregional, national, and even international significance. For example, each of three major Fire Research Laboratories has special national assignments; the total program covers the full spectrum of investigations needed to prevent and control forest fires on a national basis.

The world famous Forest Products Laboratory at Madison, Wisconsin, is the national center for research on wood and wood products. The program covers all aspects of wood from its formation during growth of the tree to its chemical makeup and physical properties. Utilization of wood—in solid form, as chips, as pulp, and even as chemical constituents—is the subject of intensive studies. This laboratory contributes basic information and applications needed to create better, more economical housing for our Nation's population, new wood-processing industries for depressed rural economies, more complete utilization of trees to stretch timber supplies, and controls for environmental pollution resulting from outmoded harvesting and wood-processing operations.

Professional and Support Personnel

The problem-solving capability of the Forest Service is vested in a staff of more than 1,100 scientists and engineers divided into more than 300 teams. This scientific staff is supported by more than 2,200 technicians, clerks, and administrative personnel.

More than 40 percent of Forest Service scientists hold doctoral degrees, and an additional 40 percent hold masters degrees.

This body of talent represents many fields of science including:

Social sciences
- Social scientist
- Economist
- Geographer
- Sociologist

Natural sciences
- General biological scientist
- Microbiologist
- Entomologist
- Botanist
- Plant pathologist
- Plant physiologist
- Geneticist
- Range conservationist
- Forester
- Soil scientist
- Fishery biologist
- Wildlife biologist

Physical sciences and engineering
- General engineer
- Architect
- Civil engineer
- Mechanical engineer
- Electrical engineer
- Electronics engineer
- Agricultural engineer
- Chemical engineer
- Industrial engineer
- General physical scientist
- Physicist
- Hydrologist
- Chemist
- Meteorologist
- Geologist
- Forest products technologist
- Operations researcher
- Mathematician
- Mathematical statistician

Research Facilities

The Forest Service operates modern laboratories at 60 locations. Special and unique facilities at the laboratories include: Electron microscopes, wood testing machines, a pilot

plant for pulp and paper research, specially equipped aircraft for remote sensing of fire and pest damage, cloud seeding aircraft, combustion chambers, rain towers, computers and electronics laboratories, insect and disease culture rooms, animal nutrition and physiology laboratories, soil property laboratories, controlled environment chambers.

Outdoor laboratories in the form of 96 Experimental Forests and Experimental Ranges provide representative communities of plants and animals for manipulation and observation. Ninety-nine Research Natural Areas provide reservoirs of genetic diversity and ecosystem study areas.

The names and locations of Forest Service research facilities are listed in the appendix.

Cooperating Scientists

Cooperative ties extend research capabilities beyond the limits of the Forest Service staff and laboratories.

Talents of eminent scientists at universities and private research organizations are brought to bear on major problems through a program of grants and agreements for extramural research.

Close ties with State, industry, and academic research programs allow the Forest Service to work hand-in-hand with others in efficiently solving mutual problems.

On the international plane, foreign currencies are used under the Food for Peace Program (Public Law 480) to provide grants for research on forestry problems by outstanding foreign scientists in their home countries. Forest Service scientists share research findings programed under the International Biological Program (IBP) of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Exchanges of scientific materials and research findings are regular features of Forest Service participation in the International Poplar Commission, Panel of Experts on Forest Gene Resources, and other technical commissions, committees and work groups of the Food and

Agriculture Organization of the United Nations (FAO). Membership in the International Union of Forestry Research Organizations (IUFRO) provides similar cooperative working relationships and scientific exchanges on a worldwide basis. Furthermore, bilateral scientific agreements with a number of other nations permit exchange of scientists, as well as scientific information. Outstanding among these is the United States-Japan Cooperative Program in Natural Resources (UJNR).

Management Documents

The Forest Service manual and handbook describe the organization, management, authorities, and other aspects of the research programs.

A document having special relevance for research personnel is the Civil Service Commission's *Guide for Evaluating Research Scientists.* It describes the procedures by which the performance of a research scientist is evaluated by a group of peers in order to establish the appropriate grade level for his position.

An important planning document is the *Environmental Program for the Future.* This report outlines a program of research to be undertaken by the Forest Service and cooperating agencies, and the educational institutions. Another important planning document is the *Forest Service Research Program for the Seventies.* It provides a detailed analysis of the goals and manpower of the current program and projections of need in relation to national goals for 1975, 1980, and 1985.

Authorities

Some legislation of special importance for forestry research includes the following:

McSweeney-McNary Forest Research Act of May 22, 1928 (45 Stat. 699), as amended and supplemented (16 USC 581a-581i, 581i-1). This was the first comprehensive law authorizing forestry research, providin, for cooperation with others, and authorizing forest experiment stations.

Agricultural Experiment Stations Act of August 11, 1955, also commonly known as the Hatch Act (7 USC 361a-361i). This act consolidated authorizations for appropriations of Federal funds to support agricultural experiment stations in States and territories and provided for regional projects. Funds are distributed under formula through the Cooperative State Research Service.

Cooperative Forestry Research Act of October 10, 1962, Public Law 87-788 (16 USC 582a-582a-7), commonly known as the McIntire-Stennis program. This act makes funds available to States on a matching basis to assist them in carrying out forestry research at land grant institutions and State-supported forestry schools. The program, administered by the Cooperative State Research Service, provides matching funds under formula.

Public Law 84-473, also called the Whitten Act of April 6, 1956, and appearing under the McSweeney-McNary Act (16 USC 581i-1). This act authorized the advancing of funds to cooperators in order to stimulate cooperative investigations in forestry.

Public Law 85-934 (42 USC 1881-1893) and Public Law 89-106 (79 Stat. 431). These laws authorized grants for basic and applied research without contribution by the grantee.

Financing

Several agencies within USDA contribute significantly to the Department's program of research for forest and range lands. Agency programs and estimated appropriations for forest and range lands (excluding construction) were as follows:

Agency and program	*Appropriations Fiscal year 1973*
Forest Service	$57,275,000
Economic Research Service	
Natural resource economics	$938,000
Cooperative State Research Service	
McIntire-Stennis Act	$4,672,000
Hatch Act	$2,000,000
Agricultural Research Service	
Shade trees and windbreaks	$606,000
Dutch elm disease	$194,000
Entomology (including gypsy moth)	$756,000
Forest products	$676,000

In fiscal year 1973, $57,275,000 were appropriated to the Forest Service for its national program of forestry research. Projections of research needed to solve the highest priority problems would require a budget by 1980 of about $134,000,000.

During each of the past 3 years the Forest Service has received more than $2,000,000 from other Government agencies plus additional sums from industry and other private sources. These funds support special research for which the Forest Service has particular competence or facilities. In some cases, the funds are pooled with Forest Service funds in a cooperative effort to expand or accelerate the research program.

Agencies of State governments, private industry, and individual citizens also make substantial sums available each year.

APPENDIX
FOREST SERVICE EXPERIMENT STATION HEADQUARTERS

(See map in the centerfold)

Pacific Northwest Forest and Range Experiment Station (PNW)
809 N.E. Sixth Avenue
P.O. Box 3141
Portland, Oreg. 97208

Pacific Southwest Forest and Range Experiment Station (PSW)
1960 Addison Street
P.O. Box 245
Berkeley, Calif. 94701

Intermountain Forest and Range Experiment Station (INT)
507 25th Street
Ogden, Utah 84401

Rocky Mountain Forest and Range Experiment Station (RM)
240 West Prospect Street
Fort Collins, Colo. 80521

North Central Forest Experiment Station (NC)
Folwell Avenue
St. Paul, Minn. 55101

Northeastern Forest Experiment Station (NE)
6819 Market Street
Upper Darby, Pa. 19082

Southeastern Forest Experiment Station (SE)
Post Office Building
P.O. Box 2570
Asheville, N.C. 28802

FPL-1
Forest Service research leads to improved efficiency in the use of wood for house construction. Here a full scale structure at the Forest Products Laboratory in Madison, Wis. is evaluated under stresses simulating those arising from hurricanes, earthquakes, and heavy snows.

Southern Forest Experiment Station (SO)
Federal Building
701 Loyola Avenue
New Orleans, La. 70113

Forest Products Laboratory (FPL)
P.O. Box 5130
North Walnut Street
Madison, Wis. 53705

Institute of Tropical Forestry (ITF)
P.O. Box AQ
Rio Piedras, Puerto Rico 00928

RESEARCH FACILITIES

Forest Service Laboratories

Pacific Northwest:

Bend, Oreg. — Silviculture Laboratory
Corvallis, Oreg. — Forestry Sciences Laboratory
Fairbanks, Alaska — Institute of Northern Forestry
LaGrande, Oreg. — Range and Wildlife Habitat Laboratory
Olympia, Wash. — Forestry Sciences Laboratory
Wenatchee, Wash. — Forest Hydrology Laboratory

Pacific Southwest:

Riverside, Calif. — Forest Fire Laboratory

Intermountain:

Bozeman, Mont. — Forestry Sciences Laboratory
Logan, Utah — Forestry Sciences Laboratory
Missoula, Mont. — Forestry Sciences Laboratory
Missoula, Mont. — Northern Forest Fire Laboratory
Moscow, Idaho — Forestry Sciences Laboratory

Rocky Mountain:

Bottineau, N. D. — Shelterbelt Laboratory
Flagstaff, Ariz. — Forestry Sciences Laboratory
Ft. Collins, Colo. — Headquarters, Rocky Mountain Forest and Range Experiment Station
Laramie, Wyo. — Forest Range and Watershed Laboratory
Lincoln, Neb. — Shelterbelt Laboratory
Rapid City, S.D. — Forestry Research Laboratory
Tempe, Ariz. — Forest Hydrology Laboratory

North Central:

Carbondale, Ill. —Forestry Sciences Laboratory
Grand Rapids, Minn. — Northern Conifers Laboratory
Houghton, Mich. — Forest Engineering Laboratory
LaCrosse, Wis. — Forest Watershed Laboratory
Marquette, Mich. — Northern Hardwoods Laboratory
Rhinelander, Wis. — Institute of Forest Genetics
St. Paul, Minn. — Headquarters, North Central Forest Experiment Station

Northeastern:

Burlington, Vt. — Sugar Maple Laboratory
Delaware, Ohio — Forest Insect and Disease Laboratory
Durham, N.H. — Forest Sciences Laboratory
Hamden, Conn. — Forest Insect and Disease Laboratory
Morgantown, W. Va. — Forest Sciences Laboratory
Parsons, W. Va. — Timber and Watershed Laboratory
Princeton, W. Va. — Forest Products and Marketing Laboratory
Warren, Pa. — Foresty Sciences Laboratory

Southeastern:

Athens, Ga. — Forestry Sciences Laboratory
Lehigh Acres, Fla. — Forest Resources Laboratory
Macon, Ga. — Forest Fire Laboratory
Olustee, Fla. — Naval Stores and Timber Products Laboratory
Research Triangle, N.C. — Forestry Sciences Laboratory

Southern:

Alexandria, La. — Alexandria Forestry Center
Auburn, Ala. — Forest Sciences Laboratory
Gulfport, Miss. — Institute of Forest Genetics and Forest Insect and Disease Laboratory
Nacogdoches, Tex. — Wildlife Habitat and Silviculture Laboratory
Oxford, Miss. — Forest Hydrology Laboratory
Sewanee, Tenn. — Silviculture Laboratory
State College, Miss. — Forest Tree Seed Laboratory
Stoneville, Miss. — Southern Hardwoods Laboratory

Forest Products Laboratory:

Madison, Wis. — Forest Products Laboratory

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Snowmelt runoff is the major source of water in the West. Early studies of snow evaporation and melt were made by the Forest Service. This photo shows the measurement of water stored in snow. The tube is inserted carefully in the snow to obtain a complete core. The core is used to determine the snow's water content.

Leased Facilities (Including Government and Federal Buildings)

Pacific Northwest:

Juneau, Alaska — Forestry Sciences Laboratory, Federal Building
Portland, Oreg. — Headquarters, Pacific Northwest Forest and Range Experiment Station
Seattle, Wash. — Forest Engineering Laboratory

Pacific Southwest:

Arcata, Calif. — Redwoods Laboratory
Berkeley, Calif. — Headquarters, Pacific Southwest Forest and Range Experiment Station

Fresno, Calif. — California Rangelands Project, Federal Building
Redding, Calif. — Silviculture Laboratory

Intermountain:

Boise, Idaho — Forestry Sciences Laboratory
Ogden, Utah — Headquarters, Intermountain Forest and Range Experiment Station
Provo, Utah — Shrub Improvement Laboratory, Federal Building

Rocky Mountain:

Albuquerque, N.M. — Forest Sciences Laboratory, New Federal Building

Northeastern:

Beltsville, Md. — Physiology Laboratory
Berea, Ky. — Forestry Sciences Laboratory
Columbus, Ohio — Federal Building
Orono, Maine — Timber Research Laboratory, USDA Building
Pennington, N.J. — Forest Environment Project
Upper Darby, Pa. — Headquarters, Northeastern Forest and Range Experiment Station

Southeastern:

Asheville, N.C. — Headquarters, Southeastern Forest Experiment Station
Charleston, S.C. — Forestry Sciences Laboratory, Federal Building
Franklin, N.C. — Coweeta Hydrologic Laboratory, Forest Service Building

Southern:

New Orleans, La. — Headquarters, Southern Forest Experiment Station

Institute of Tropical Forestry:

Rio Piedras, P.R. — Headquarters, Institute of Tropical Forestry

Facilities Provided by Universities or States

Pacific Southwest:

Honolulu, Hawaii — Institute of Pacific Island Forestry (State)

Rocky Mountain:

Tucson, Ariz. — Range Research Laboratory (University)

Northeastern:

Amherst, Mass. — Forest Environment Research Unit (University)
Syracuse, N.Y. — Forestry Sciences Laboratory (University)

North Central:

Columbia, Mo. — Forestry Sciences Laboratory (University)
Duluth, Minn. — Timber Marketing and Utilization Laboratory (University)
East Lansing, Mich. — Forestry Sciences Laboratory (University)

Southeastern:

Blacksburg, Va. — Forestry Sciences Laboratory (State)
Macon, Ga. — Southern Forest Fire Laboratory (State)
Marianna, Fla. — Forestry Sciences Laboratory (State)
Clemson, S.C. — Forest Recreation Unit

Southern:

Fayetteville, Ark. — Forestry Sciences Laboratory (University)
Tuskegee, Ala. — Forest Recreation Unit (University)

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